HISTORICAL COLUMN

GRIFFITH EVANS 1835-1935
DISCOVERER OF THE FIRST PATHOGENIC TRYPANOSOME

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"There's a destiny that shapes our ends
Rough hew them how you will".
Shakespeare

The life of Griffith Evans bears witness to Shakespeare's perceptive lines although were it not for his inherited abilities, his destiny might have been very different. He was born August 7, 1835, the only son of a Welch farmer, Evan Evans, near Townyn, Wales. Griffith Evans' early life was fashioned by his devoted mother and father and a household of ladies that included 2 sisters, 2 aunts, a governess, 2 maids and a dominating grandmother. Her biblical instruction and indoctrination on the evils of alcohol were never forgotten.

As the young Evans grew toward manhood, the father hoped that he would till the farm that had been worked since 1730 by an Evans or a Griffith. A career in medicine was more appealing to the son, especially after he was apprenticed to the local doctor, John Pughe. Suddenly destiny decided otherwise. The father faced financial ruin. Dr. Pughe, recognizing Evans' talent and interests, suggested that he become a veterinarian. Qualifications could be obtained in two years if he was accepted by the Royal College. It was now December 1853. The term had begun. However his late application was accepted. Standards of veterinary science at the time were low. Most students were more interested in a good time than in scholarly pursuits. Not Evans. He bought a microscope for £5 as none was provided. It opened a new world that to him was more interesting than shoeing horses. Diligence had its reward for, after 18 months, he graduated at the head of his class. For the next five years he assisted a veterinarian near his home.

By a quirk of fate Evans learned that the Crimean War had created a need for veterinary officers in her Majesty's regiments. He sat for, and passed, the required examination to become an officer and was commissioned in 1860 to the Royal Artillery. This caused raised eyebrows in some quarters as the usual route to an army commission was by patronage or purchase. The disciplined life of the army appealed to Evans but not to his mother. "She thought," wrote his biographers (1), "he was destined for a life of debauchery, low living and drunkeness." She was somewhat consoled when her soldier son wrote that the officers' mess was not a den of vice and the elegance of the furnishings and surroundings was impressive — very different from those left behind. His teetotal pledge may have bothered others but not him.

The following year his regiment was dispatched to Montreal to deal with Fenian raids. Regimental duties were light. Permission was sought, and granted, to enrol in medicine at McGill University and in 1864 he achieved his earlier ambition when he received his medical degree. His independent thought was apparent in his thesis on "Tuberculosis", in which, contrary to the view of his professor, he advocated fresh air and sunshine rather than confinement in a dark, stuffy room.

In 1870 his battery returned to England. Shortly thereafter he married Catherine, the daughter of family friends, Dr. and Mrs. John Jones. At the wedding, the eccentric groom "whisked the bride away," stated the record, "without so much as a look at the wedding breakfast prepared for them" (1).

Postings during the next 7 years in Britain and Ireland were rather uneventful. Spare time was used to study histology, physiology and ophthalmology. His interest was in research rather than medical practice although he was pleased to see a patient with tetanus recover with symptomatic treatment only. This was 14 years before the cause was known and no one knew what to do. Soon the pattern of life would change again. The Queen's Principal Veterinary Surgeon, impressed by Evans' extensive veterinary and medical knowledge, had recommended a posting to India, where a few months before Queen Victoria had been proclaimed Empress.

His first assignment was to Sialkot north of Bombay, to investigate a serious disease of horses. Work at Sialkot was difficult. "The glare, the intense heat, the stench, the lack of another pair of hands, certainly did not make for fruitful research"(1), he wrote. Nevertheless after weeks of untiring effort, he concluded the horses were dying from anthrax, the cause of which had been isolated recently by Koch. More importantly, he noted the enormous number of white blood cells and was convinced that they had some relationship to the disease, but, he said, "I could not think what it was" (1). He asked, but was refused, permission to pursue the question further. Four years later the famous Metchnikoff would report the significance of these cells. Evans' efforts were appreciated however, for he was promoted to the rank of Major and became Inspecting

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Veterinary Surgeon for the district of Bengal with headquarters at Calcutta. He learned at the same time that he would have to spend the next five years in India. Long letters to his family, some of 8000 words, helped to dispel his longing to be with them, and he learned that his wife could join him in 1880.

Shortly before her arrival, the second Afgan War began. The survival of the British Punjab Force depended on horses. Hundreds of them were dying from a mysterious disease called surra. Evans, known for his tenacity and ability, was asked to go at once to the North West Frontier, considered by some the most dangerous in the world, and investigate the disease. He insisted on receiving permission to try to transfer the disease to healthy animals. He was told that would be impossible as extra animals were in short supply, but he persisted in his demand and received permission. He read all reports on surra he could obtain and began to suspect the disease was caused by a parasite in the blood.

Evans arrived at Dera Ismail Khan, on the banks of the Indus river, on September 18. The heat in this desert town was intense. Moreover, he could scarely move unless accompanied by a troop of cavalry because of possible attack by Afgans. He was a keen microscopist and began at once to examine blood from sick and healthy horses. He was tormented by flies which swarmed on his face, soiled the lenses, and disturbed the vision. He persevered nevertheless and was thrilled when his first observations revealed that the blood from sick horses was teeming with parasites. "See it's alive with microbes", he exclaimed as he demonstrated them to the medical officer (1). He transferred blood from sick to healthy horses which became ill within six days and the same parasites were seen in the blood. Likewise he transferred the parasite to dogs. He was convinced that the microbes, which later were described as trypanosomes, were the cause of surra. His contemporaries and superiors refused to believe the organisms were the cause of the disease.

Evans, convinced that the parasites were the cause, turned his attention to their mode of spread. Could they be obtained from water? Blood containing parasites was added to water. They disappeared. Then a belief of the native people provided a clue. They thought a fly called *bhurra dhang* (a species of horse fly), was responsible. The idea appealed to him for he had seen the horses with blood streaming down their legs from the bites of flies. Furthermore the disease was especially noticeable at those posts where horses were kept close together; "the fly in such cases", he wrote, "is able to go from one horse to another before the blood about its mouth is dry" (1). Proof of his belief came in 1899 when Leonard Rogers showed that surra was transmitted by tabanid flies (2).

Two months after arrival at Dera Ismail Khan, Evans had his report ready for the Governor of the Punjab. The significance of his discovery was not appreciated by senior colleagues or the Governor. They believed he was confusing cause and effect and that he had "a bee in his bonnet". However he was certain that his views were correct.

His investigation of surra ended. Evans hurried back to Calcutta to meet his wife whom he had not seen for 3 years. He was then assigned to investigate anthrax in a healthier part of the country, the hills of Assam. It was a pleasant interlude, before being posted as Inspecting Veterinary Surgeon to the Madras Presidency. Clearly the latter was a demotion. Officials in Calcutta would no longer be confronted with this strong-willed, abrasive character with views contrary to theirs.

A brilliant, young veterinarian named J.H. Steel played an important role, albeit a somewhat mixed-up one, in confirming Evans' conclusions concerning surra. Steel, assigned to investigate surra in Burma in 1885, asked Evans to join him. Steel, using a rather inferior microscope, saw organisms that he believed were spirachaetes in the blood of horses. He believed Evans was correct and that these were the cause of surra. More careful observation would have revealed that they were flagellates. Steel named the organisms *Spirochaeti evansi.* Several years later (1896), the taxonomic error was corrected when they were placed in the genus *Trypanosoma* (3).

The value of Evans' observations was largely overlooked for years. Then R.F. Montgomerie wrote in the Veterinary Record (4), "So far as India was concerned at that time, Evans might as well never visted Dera Ismail Khan, never had seen a case of surra, never had discovered *Trypanosome evansi.* When Evans came to place on record the reasoning which brought him to regard microbes as pathogenic rather than as forms developing in blood diseased through some chemical change, his light shone with real brilliance. Logic — yes! The purest of pure thinking set out what now seems an unanswerable case. Yet officially he was hounded for his views. He was regarded as a crank. He was forthwith sent from Bengal".

Evans' final years in India at Ootocamund in the Madras Presidency proved more gratifying than he had anticipated. The climate and landscape were pleasant. A much wanted son and a fourth daughter were born. He was promoted to the rank of Lieutenant-Colonel. The Indian Government by 1885 was more appreciative and repeatedly sought his advice. Nevertheless he looked forward with hope to returning to England. The order came. He and his wife and children were off to Woolich on November 18, 1885 but his last years with the army were far from happy. The Queen's Principal Veterinary officer, Fleming, resented him. In 1886 Evans met with Professor E.M. Crookshank who had established a laboratory for human and veterinary diseases at King's College. Crookshank recognized the value of Evan's discovery and together they planned experiments with trypanosomes in monkeys. A licence to use live animals was required. Evans returned a few weeks later to say the plan had been dropped but gave no reason. Forty years later, at age 90, Evans revealed the reason to Sir Frederick Smith of the Wellcome Laboratories. Queen Victoria was a strong anti-vivisectionist. Someone had tipped her off about the experiments and asked that no licence be granted. Evans, a loyal subject, dropped the plan.

He retired to Wales in 1890 at the age of 55 and lectured for the next 20 years on Veterinary Hygiene at University College, Bangor. Life was no more placid than before. "He became embroiled", his biographers wrote (1), "in controversies on local politics, free trade, home rule for

Ireland, religion, suffragettes, total abstinence or whatever was in season." Happily, following a lecture in 1915 by Sir William Osler to the North Wales Branch of the British Medical Society where reference was made to Evans' work in India, honors began to shower upon him. He was now over 80. The Liverpool School of Tropical Medicine awarded its highest honor, The Mary Kingsley medal, in 1917 "for distinguished service in the cause of tropical medicine by original research" (5). In 1918 he received the coveted Henry Steel Memorial Medal of the Royal Veterinary College and, "for his pioneer research in parasitology", the University of Wales granted him the honorary D.Sc. degree in 1919. The army gave him a distinguished service pension in 1913. And in 1931 at the age of 96 he received the Freedom of the City of Bangor.

Although partially incapacitated and often bedridden during the last five years of his life with a broken leg, a broken hip, and impaired sight and hearing, Evans was mentally alert. He wrote a 1000-word article on life in India at the request of the *Indian Veterinary Journal.* Finally, on his 100th birthday, surrounded by his children, among them Wynona, named because of friendship with a tribe of Red Indians, and Erie, named after lake Erie, he was greeted and congratulated by dignitaries from near and far. Perhaps the most gratifying message was a letter from the Quartermaster General of India on behalf of the Royal Army Veterinary Corps. It read in part ". . . Surra has lost its terror on active service and the progress dates from the day when you found *Trypanosoma evansi.*"

Four months later, on December 7, 1935, life for this man who "had sought no reward in the halls of fame", ended peacefully.

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